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Effects of the tablets' organoleptic properties on patients' compliance

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ABSTRACT

This study aimed to investigate the effect of the organoleptic properties of tablets on patient compliance. A multidisciplinary approach is necessary to develop drugs that are suitable for each population and to ensure drug optimization. According to this, the patient's opinion should be sought. A personal interview (face-to-face) method was used for this study. Participants were asked seven questions about tablet shape, size, color, flavor, and coating. The target population for this study was chosen from five different age groups, and from each age group, fifty males and fifty females participated. As a result of this study, when all the responses were analyzed, the oval tablet shape, eight millimetres tablet size, white tablet color, tasteless tablet, and coated tablet were preferred. This study concluded which organoleptic properties of tablets were most preferred by different categories of patients.

Keywords: tablet, organoleptic, patient compliance, patient preferences, survey

INTRODUCTION

Organoleptic properties have a significant impact on patient compliance, especially when the drug is administered orally[1]. By utilizing these properties, patients will perceive the medication as more pleasant, which improves the patient's quality of life[1–3]. The physical appearance of the drug needs to reflect the

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general preferences (shape, size, color, flavor, and coating) of the population in order to promote patient acceptance and compliance with drug treatment[4].

The patient's compliance with the drug changes according to the different organoleptic properties of tablets[3,5]. Many patients find swallowing drugs uncomfortable[6], and both physical and psychological factors, as well as the possibility of some tablets having an unpleasant taste or odor, can contribute to this discomfort[7,8] This could consequently lead the patient to be non-compliant with the drug[9]. An interdisciplinary approach is essential for the development of drugs that are tailored to specific populations and to ensure the optimization of drug efficacy[10,11] According to this, the patient's opinion should be sought. Evaluating the differences in the organoleptic properties of tablets and how they could impact patient compliance and drug acceptability is necessary[12,13].

This study aimed to investigate patient preferences for different organoleptic properties, which we determined in this study as the shape, size, color, flavor and surface properties (coating or uncoating) of the tablet. By conducting a survey, we were able to figure out which of the features mentioned above are mostly preferred by different categories of patients. Knowing the preferences of patients will increase the patient's compliance with the drug. This data is meant to be delivered to pharmaceutical industry companies and clinics to achieve the main goal of this study.

METHODOLOGY

This study is descriptive regarding research purpose and a quantitative survey method in terms of method type. For the research, a questionnaire with seven questions was prepared, and it included questions about various organoleptic property features.

Participants were asked to choose gender (male or female), and age group (twelve-seventeen, eighteen-thirty-four, thirty-five, fifty-four, fifty-five, seventy-four, or over seventy-five). Then, participants were prompted to indicate their preferences for tablets of various shapes (oval, circular, diamond, octagonal, or square), sizes (four mm, six mm, eight mm, ten mm, or twelve mm), colors (white, pink, blue, orange, red, and brown), flavors (tasteless, sugary, bitter, salty, or fruity) and surface properties (coated or uncoated surface).

The study setting

This study was conducted at multiple locations in the Republic of Türkiye. The decision to take part in the study was voluntary. All participants were informed of the research procedure and purpose. Participants who had trouble finishing the study were not included, and it was acceptable for participants to leave the study.

Sample strategy

The target population for this study was chosen from five different age groups. Twelve-seventeen, eighteen thirty-four, thirty-five, fifty-four, fifty-five, seventy-four, and over seventy-five were the age groups of the participants. From each age group, fifty males and fifty females made up a total of one hundred participants. The overall number of participants was five hundred. This deliberate choice ensured a balanced representation of both genders within each age category, allowing for a comprehensive analysis of potential variations in preferences. The study did not include visually impaired individuals because there were components of visual perception.

Data collection

This study was done by personal interview (face-to-face). The participants were given a survey consisting of structured questions. The data was collected and analyzed using the SPSS (IBM Statistical Product and Service Solutions Statistics, Version 26.0.) program.

Data analysis

The SPSS analysis program was utilized to analyze the data collected by the survey. The participants' preferences were analyzed and thoroughly examined, and percentage analysis was performed on the results using SPSS program applications.

RESULTS and DISCUSSION

Tablet shape results

The relation between age and tablet shape is demonstrated in Figure 1(a). It illustrates the preferred tablet shape in each age group. In the age groups of 12-17 and 35-54, the most preferable tablet shape was circular, while it was oval in the rest of the age groups. It was noticed that octagonal tablets are the least preferred in all groups.

The relation between tablet shape and gender is demonstrated in Figure 1(b). It shows the preferred tablet shape according to males and females. It is obvious that most males preferred circular and oval tablets, with a slightly increased preference for circular ones. On the other hand, most females preferred oval tablets. It is worth mentioning that a considerable percentage of females preferred circular tablets. Regarding the least preferred shape, both males and females considered the octagon as their least preferable shape.

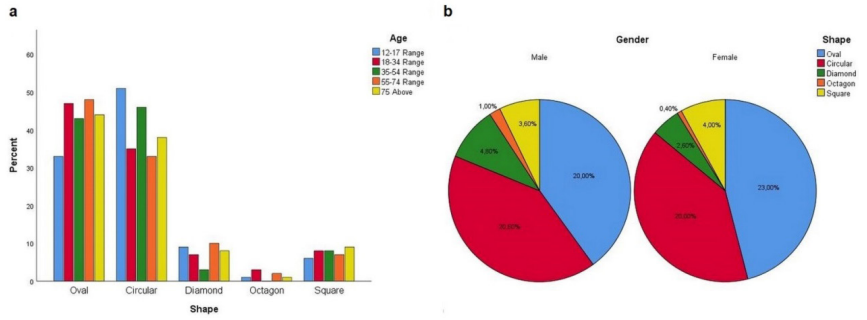

Figure 1. Percentage of preferred tablet shapes according to: (a) age; (b) gender

Tablet size results

The relation between age and tablet size is demonstrated in Figure 2(a). It demonstrates the preferred tablet size in each age group. According to the findings of this survey, for responders between the ages of 12-17, 18-34, and 35-54, eight millimeters was the most preferred size, while twelve millimeters was the least.

Moreover, four millimeters was the most preferred size in the age groups of 55-74, 75 and above. Regarding most minor preferable sizes, six and twelve millimeters were the least preferred among respondents aged 55-74, and both sizes were approximately equally preferred by this group. Finally, the least preferable size was ten millimeters in the 75 and above age ranges.

The relation between tablet size and gender is demonstrated in Figure 2(b). It illustrates the preferred tablet size among males and females. The results of this survey indicate that males tend to prefer sizes of eight millimeters the most, whereas, for females, it is four millimeters. Regarding the least preferred size, both males and females considered twelve millimeters their least preferable size.

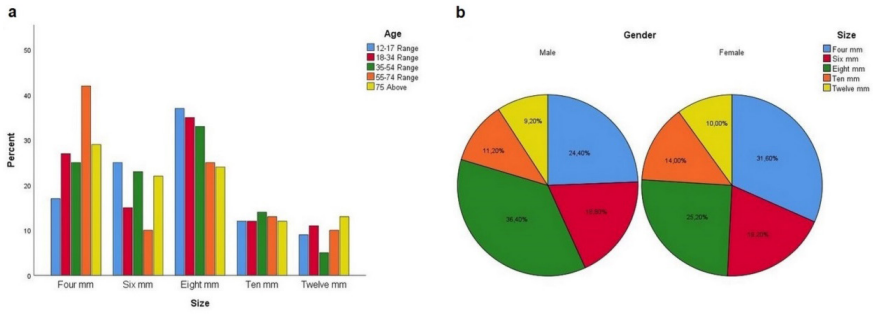

Figure 2. Percentage of preferred tablet sizes according to: (a) age; (b) gender

Tablet color results

The relation between age and tablet color is demonstrated in Figure 3(a). It demonstrates the preferred tablet color in each age group. Across all age ranges, white was the most preferred tablet color. When compared to other age groups, individuals aged 75 and above preferred the white color the most. The least preferable color was brown in the 12-17, 18-34, and 75 and above age ranges. Moreover, red was the least preferred color in the 35-54 and 55-74 age ranges.

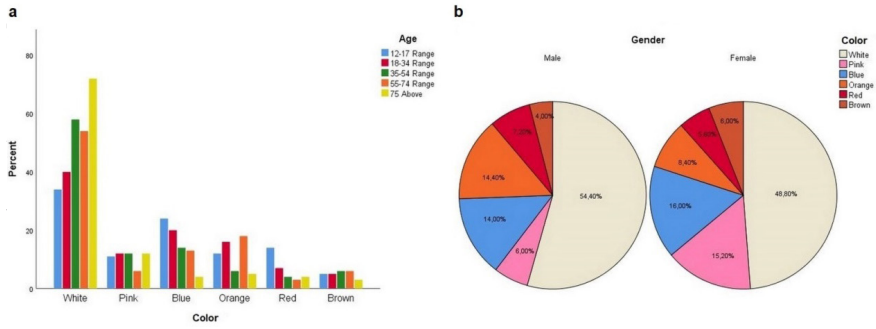

Figure 3. Percentage of preferred tablet colors according to: (a) age; (b) gender

Tablet flavor results

The relation between age and tablet flavor is demonstrated in Figure 4(a). It demonstrates the preferred tablet flavor in each age group. The most preferred tablet flavor across all age ranges was tasteless. Regarding least favorites, salty was the least preferred tablet flavor across all age ranges except 55-74. However, the flavors that people between the ages of 55-74 appreciated the least were salty and bitter.

The relation between tablet flavor and gender is demonstrated in Figure 4(b). It illustrates the preferred tablet flavor among males and females. According to the findings of this study, both males and females preferred the tasteless flavor the most. Figure 4(b). clearly concludes that males appreciated the tasteless flavor considerably more than females. In terms of the least preferable flavor, salty was the least preferred by both genders.

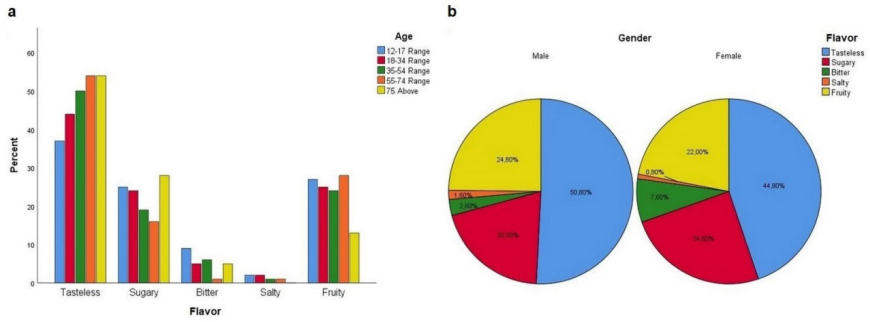

Figure 4. Percentage of preferred tablet flavors according to: (a) age; (b) gender

Tablet cover results

The relation between age and the tablet cover is demonstrated in Figure 5(a). It demonstrates the preferred tablet cover in each age group. Across all age ranges, coated tablet covers were the most preferred, while uncoated tablets were the least.

The relation between the tablet cover and gender is demonstrated in Figure 5(b). It illustrates the preferred tablet cover among males and females. According to the results of this survey, the most preferred cover for both males and females was coated. Though almost equally chosen by both genders, it is important to note that females preferred the coated cover slightly more than males.

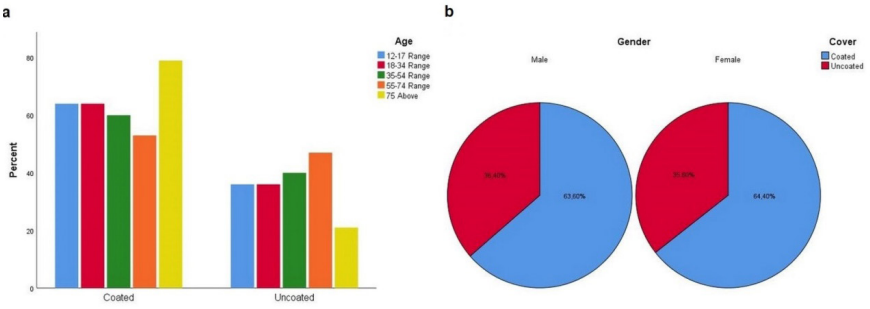

Figure 5. Percentage of preferred tablet covers according to: (a) age; (b) gender

Insights into patient preferences for tablets' organoleptic properties

The organoleptic properties of tablets enhance the drug's acceptability to patients and thereby positively influence their quality of life[2,14]; however, a paucity of knowledge persists regarding the organoleptic properties of tablets and their impact on acceptability. Recognizing these attributes is crucial for understanding patient preferences and, consequently, patient compliance[15,16]. Regarding the tablet's shape, multiple studies have demonstrated that rounder shapes are favored over angular shapes in diverse contexts, and according to the findings, patients chose rounder shapes, stating that they were easier to swallow[9,17,18]. Participants in our study reveal that rounder shapes are favored over angular shapes. Participants expressed that they made this choice because they perceived round tablets as easier to swallow. Our findings align with previous research, reinforcing the established preference for rounder tablet shapes. This consistent pattern highlights the practical significance of considering tablet shape in pharmaceutical design. Moreover, participants further emphasized the importance of tablet shape in differentiating and remembering the drug.

As for the tablet size, concerns emerged regarding the perceived smallness of four-millimeter tablets, with participants expressing worry about potential tracheal escape during swallowing. Older participants cited visibility issues with smaller tablets while acknowledging that twelve-millimeter tablets might be too large for comfortable swallowing. Interestingly, some older participants without swallowing difficulties preferred the larger tablet due to enhanced visibility.

Evidence suggests that the prevalence of swallowing issues and dysphagia is anticipated to rise among the aging population in the upcoming years, consequently posing challenges to the administration of oral medications[19,20]. Medication noncompliance is more prevalent among elderly patients, emphasizing the necessity for enhanced research and strategies for overcoming challenges[21,22]. In light of these projections, exploring innovative solutions and interventions to address this emerging issue is imperative.

Regarding tablet color, findings in numerous previous studies suggest that altering a drug's color can influence perceived efficacy[17,23,24]. Although there is a consensus on human perception of colors, it is crucial to acknowledge that factors including gender and culture can alter color perception[23]. The most preferred color for tablets, as indicated by various studies, was found to be white. Furthermore, participants believed that white tablets are perceived as more effective than tablets of other colors[9,17]. In our study, analysis of participant

feedback indicated favoring white tablets, perceived as more 'natural,' while other colors were noted to compromise the tablet's naturalness and potentially reduce drug efficacy.

Furthermore, the flavor is a major factor significantly impacting patients' compliance[25] and can be altered by different flavoring agents, affecting the drugs' acceptability[26,27]. Pharmaceutical formulations that lack palatability face challenges in achieving acceptability among patients[28,29] and, consequently, face obstacles in achieving desired therapeutic outcomes[29]. In evaluating tablet flavor within our study, participants preferred tasteless tablets, associating them with naturalness due to the absence of additives. Participants suggested that the flavor of tablets could influence or diminish the drug's effectiveness.

Finally, in the discussion on tablet cover, recent studies emphasize a substantial preference for coated tablets among patients, primarily because uncoated tablets pose greater difficulty in swallowing[9,18,30,31]. Reduced stickiness was observed in coated tablets, highlighting the advantageous impact of promoting a smooth passage through the esophagus[9,32,33]" Our study similarly concluded that participants favored the coated tablet due to its ease of passage through the esophagus. Notably, within the entire tested population, the uncoated tablet emerged as the least preferred option.

The outcomes emphasize the importance of considering diverse patient needs in developing and optimizing pharmaceuticals. Preferences can exhibit variability among various societies and individuals. Therefore, considering patients' needs and preferences can make treatment options more personalized and patient-centric. As the study unveils specific preferences across demographics, it highlights a pathway for enhancing patient compliance, ultimately promoting improved health outcomes.

When the survey's findings were analyzed, it was revealed that the oval, eight millimeters, white, tasteless, and coated tablets were the most preferred choices, while the octagonal, twelve millimeters, brown, salty, and uncoated were the least preferred among the overall tested population.

STATEMENT OF ETHICS

Research participants voluntarily agreed to take part after receiving information about the research procedure and purpose. They were informed that they could withdraw from the study if they experienced any difficulties or wished to leave at any point. Furthermore, prior to commencing the study, ethical approval was obtained from the relevant ethics committee. This approval ensured that the research protocol adhered to ethical guidelines and standards set forth by the Declaration of Helsinki.

CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interests.

AUTHOR CONTRIBUTIONS

Study concept and design: M.S., N.S.Ü.; Acquisition of data: F.B.; Data analysis/interpretation: M.S., F.B., N.S.Ü.; Preparation of figures: G.Ç.; Drafting/writing of manuscript: N.S.Ü.; Critical revision: M.S., N.S.Ü.

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